

CLAIMS

1. Procedure for preparing amorphous silica comprising the following phases:
- a) reaction of a calcium silicate with CO_2 in an aqueous environment with the formation of a suspension **1** of agglomerated particles of SiO_2 and CaCO_3 ;
 - b) treatment of the suspension **1** with a compound of aluminium, boron or zinc or mixtures of the same in a neutral or basic environment, and formation of a solid phase **2** in a solution **3** containing particles of SiO_2 with nanometric dimensions;
 - c) separation of the solid phase **2** from the solution **3**;
 - d) treatment of the solution **3** according to one of the following methods;
 - e) precipitation or drying;
 - f) gelation.
2. Procedure according to claim 1, wherein the reaction of phase a) is carried out in an autoclave at a pressure between 0.3 MPa and 3 MPa and at a temperature between 10°C and 100°C .
3. Procedure according to claim 2, wherein the pressure is between 1.0 and 2.5 MPa and the temperature is between 15°C and 40°C .
4. Procedure according to claim 3, wherein the pressure

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is equal to 2 MPa and the temperature is equal to 20°C or 30°C.

5. Procedure according to claim 1, wherein the compound of aluminium, boron or zinc is a salt chosen among
5 aluminates, borates or zincates.

6. Procedure according to claim 5, wherein the salt is an alkaline aluminate or an alkaline earth aluminate

7. Procedure according to claim 5, wherein the salt is a sodium aluminate

10 8. Procedure according to claim 1, wherein the neutral or basic environment is realised using a solution of hydroxides or salts of alkaline metals or alkaline earth metals.

9. Procedure according to claim 8, wherein the solution
15 is an aqueous solution of hydroxides of alkaline metals or alkaline earth metals.

10. Procedure according to claim 8, wherein the solution is an aqueous solution of sodium hydroxide.

11. Procedure according to claim 1, wherein the particles
20 of silica in the solution **3** have dimensions between 1 and 100 nanometers.

12. Procedure according to claim 1, wherein the separation phase c) is carried out by centrifugation.

13. Procedure according to claim 1, wherein the solid

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phase 2 coming from the separation phase c) is recycled so as to be again subjected to treatment with sodium aluminate as in phase b).

14. Procedure according to claim 1, wherein the precipitation treatment e) is carried out with the addition of CO₂, at environment pressure and temperature.

15. Procedure according to claim 14, wherein the phases that formed during the precipitation phase are separated by filtration and the solid kept back by the filter is washed until a neutral pH is reached in the washing waters

16. Procedure according to claim 1, wherein the gelation treatment f) is achieved by acidification, for example by adding CO₂, at environment temperature, to a pH lower than 7, and is followed by the evaporation of the liquid phase.

17. Precipitated silica that can be obtained with the procedure according to one of the claims from 1 to 16, characterised by having purity $\geq 96\%$

18. Use of the silica obtained with the procedure according to any one of the claims from 1 to 16 as an additive in mixtures for tyres.

19. Use of the silica obtained with the procedure according to any one of the claims from 1 to 16 as an

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additive in High Performance Concretes.

20. Use according to claim 19 in high or very high strength concretes (DSP).

21. Use of the silica obtained with the procedure
5 according to any one of the claims from 1 to 16 as a reinforcing load in rubber and other organic polymers, as a pigment partially substituting TiO_2 in the production of paper and coating, as a dimmer in the water paint and varnishes industry, as a thinner in solid formulations,
10 as an anti-blocking agent to prevent adhesion between smooth surfaces, as an anti-binding agent or a catalytic support.

22. Use of the solid phase 2, composed of silica and calcium carbonate, obtained after phase c) of the
15 procedure according to claim 1, as an additive in mixtures for tyres.

23. Use of the solid phase 2, composed of silica and calcium carbonate, obtained after phase c) of the procedure according to claim 1, as an additive in High
20 Performance Concretes.

24. Use according to claim 23 in high or very high strength concretes (DSP).

25. Composition of precipitated silica which may be obtained according to the procedure of claim 1.

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